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DOCUMENT-IDENTIFIER: US 6055494 A
TITLE: System and method for medical language extraction and encoding

Abstract Text (1):
In computerized processing of natural-language medical/clinical data including
phrase parsing and regularizing, parameters are referred to whose value can be
specified by the user. Thus, a computerized system can be provided with
versatility, for the processing of data originating in diverse domains, for
example. Further to a parser and a regularizer, the system includes a preprocessor,
output filters, and an encoding mechanism.

INVENTOR (1):
Friedman; Carol

Brief Summary Text (2):
This invention relates to natural language processing and, more specifically, to
computerized processing of natural-language phrases found in medical/clinical data.

Brief Summary Text (3):
Clinical information as expressed by health care personnel is typically provided in
natural language, e.g., in English. But, while phrases in natural language are
convenient in interpersonal communication, the same typically does not apply to
computerized applications such as automated quality assurance, clinical decision
support, patient management, outcome studies, administration, research and
literature searching. Even where clinical data is available in electronic or
computer-readable form, the data may remain inaccessible to computerized systems
because of its form as narrative text.

Brief Summary Text (4):
For computerized applications, methods and systems have been developed for
producing standardized, encoded representations of clinical information from
natural-language sources such as findings from examinations, medical history,
progress notes, and discharge summaries. Special-purpose techniques have been used
in different domains, e.g., general and specialized pathology, radiology, and
surgery discharge reports.

Brief Summary Text (7):
C. Friedman et al., "A General Natural-Language Text Processor for Clinical
Radiology", Journal of the American Medical Informatics Association, Vol. 1 (April
1994), pp. 161-174;

Brief Summary Text (9):
C. Friedman et al., "Natural Language Processing in an Operational Clinical
Information System", Natural Language Engineering, Vol. 1 (March 1995), pp. 83-106.

Brief Summary Text (11):

A preferred method for computerized processing of natural-language medical/clinical data includes basic steps here designated as phrase parsing and regularizing and, optionally, code selection. Further included, preferably, is a step of pre-processing prior to phrase parsing, and a step of output filtering. Output can be generated in the form of a printout, as a monitor display, as a database entry, or via the "information highway", for example.

Detailed Description Text (3):
A natural-language phrase included in medical/clinical data is understood as a delimited string comprising natural-language terms or words. The string is computer-readable as obtained, e.g., from a pre-existing database, or from keyboard input, optical scanning of typed or handwritten text, or processed voice input. The delimiter may be a period, a semicolon, an end-of-message signal, a new-paragraph signal, or any other suitable symbol recognizable for this purpose. Within the phrase, the terms are separated by another delimiter, e.g., a blank or another suitable symbol.

Detailed Description Text (4):
As a result of phrase parsing, terms in a natural-language phrase are classified, e.g., as referring to a body part, a body location, a clinical condition or a degree of certainty of a clinical condition, and the relationships between the terms are established and represented in a standard form. For example, in the phrase "moderate cardiac enlargement", "moderate" is related to "enlargement" and cardiac is also related to "enlargement".

Detailed Description Text (7):
Regularizing involves bringing together terms which may be discontiguous in a natural-language phrase but which belong together conceptually. Regular forms or composites are obtained. Regularizing may involve reference to a separate knowledge base. For example, from each of the phrases "heart is enlarged", "enlarged heart", "heart shows enlargement" and "cardiac enlargement", a regularizer can generate "enlarged heart".

Detailed Description Text (9):
FIG. 1 shows a preprocessor module 11 by which natural-language input text is received. The preprocessor uses the lexicon knowledge base 101 and handles abbreviations, which may be domain dependent. With the domain parameter properly set, the preprocessor refers to the proper knowledge base. For example, depending on the domain, the abbreviation "P.E." can be understood as physical examination or as pleural effusion. Also, the preprocessor determines phrase or sentence boundaries, and generates a list form for each phrase for further processing by the parser module 12.

Other Reference Publication (4):
C. Friedman ete al., "A General Natural--Language Text Processor for Clinical Radiology", Journal of the American Medical Informatics Association, vol. 1 (Apr. 1994), pp. 161-174.

Other Reference Publication (6):
C. Freidman et al., "Natural Language Processing in an Operational Clinical Information System", Natural Language Engineering, vol. 1 (May 1995), pp. 83-108.

Other Reference Publication (7):
C. Friedman et al., "Architectural Requirements for a Multipurpose Natural Language Processor in the Clinical Enviroment". In: R.M. Gardner, ed., Proceedings, Nineteenth Annual Symposium on Computer Applications in Medical Care, Hanley & Belfus, Nov. 1995, pp. 347-351.

CLAIMS:

1. A computer method for processing medical/clinical data comprising a natural-language phrase,

the method comprising parsing the natural-language phrase and regularizing the parsed phrase,

wherein said parsing step comprises referring to a domain parameter whose value is indicative of a medical/clinical domain from which the data originated, and wherein said domain parameter corresponds to one or more rules of grammar within a knowledge base related to said medical/clinical domain to be applied for parsing said natural language phrase.

9. A computer system for processing medical/clinical data comprising a natural-language phrase,

the system comprising means for parsing the natural-language phrase and means for regularizing the parsed phrase,

wherein the said parsing step means comprises means for referring to a domain parameter whose value is indicative of a medical/clinical domain from which the data originated, and wherein said domain parameter corresponds to one or more rules of grammar within knowledge base related to said medical/clinical domain to be applied for parsing said natural language phase.

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Search History

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